MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2022 / 2023 (TERM ID 2215)

PCO0165 – INTRODUCTION TO COMPUTER ARCHITECTURE AND OPERATING SYSTEM

(Foundation in Information Technology)

24 FEBRUARY 2023
9.00 a.m – 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 3 pages (excluding the cover page) with 5 questions only.

2. Answer **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in the Answer Booklet provided.

Instructions: Answer **ALL** questions. Write your answers in the Answer Booklet.

QUESTION 1 [10 Marks]

a. In order to be a good "software designer" we need to understand how to improve code performance. We often ignore architecture when doing high level programming. Explain briefly why a software designer has to study computer architecture.

(2 marks)

b. Explain briefly **TWO (2)** characteristics of a computer design in the second generation.

(2 marks)

c. Processor organization describes the interconnection of the major components of a CPU to the rest of the computer system via the system bus. List and briefly describe **TWO (2)** of the tasks that the processor must perform.

(2 marks)

d. Explain briefly **TWO (2)** features of Intel Pentium M microprocessor technology.

(2 marks)

e. Briefly explain what instruction throughput is and how pipelining increases the throughput of the instruction.

(2 marks)

QUESTION 2 [10 Marks]

a. Convert the following binary numbers to decimal equivalents. Show computation steps.
   i. 11100001.110_2
   ii. 11010100.001_2

(2 marks)

b. Convert the following hexadecimal notations to their binary equivalents. Show computation steps.
   i. $78C.2A_{16}$
   ii. $3B6.F5_{16}$

(2 marks)

c. Convert the decimal notation 23.75_{10} to its binary equivalent. Show computation steps.

(2 marks)

d. Convert the decimal number 1004_{10} notation to their hexadecimal equivalents. Show computation steps.

(2 marks)

e. Show the steps how would 1101.01_2 represent in the 32-bit floating-point.

(2 marks)

Continued...

QUESTION 3 [10 Marks]

a. Calculate the addition arithmetic operation of the following unsigned binary numbers. Show computation steps.
   i. 11100100 + 01101011
   ii. 11001110 + 11101101

(2 marks)

b. Calculate the subtraction arithmetic operation of the following unsigned binary numbers. Show computation steps.
   i. 10010000 - 01011010
   ii. 01111000 - 01100001

(2 marks)

c. Solve the following addition operations using the two's complement addition in 5-bit for signed integer. Show computation steps.
   i. (-12) + (15)
   ii. 14 + (-11)

(2 marks)

d. Solve the subtraction operation (-7) - (-3) using the two's complement subtraction in 4-bit for signed integer. Show computation steps.

(2 marks)

e. Solve the subtraction operation (9) - (-5) using the two's complement subtraction in 4-bit for signed integer. Show computation steps.

(2 marks)

QUESTION 4 [10 Marks]

a. What is the function of accumulator in assembly language of 8085 microprocessor?

(2 marks)

b. Write an assembly program based on the following steps:
"Set value in memory location **4000H** as **DBH** and value in memory location **4001H** as **48H**. Subtract the contents of memory location **4001H** from contents of memory location **4000H** and place the result in memory location **4002H**. Use direct addressing mode to solve the problem".

(3 marks)

c. Write an equation from the assembly program in question 4b.

(2 marks)

d. Draw a flow chart based on the equation in question 4c.

(3 marks)

Continued...

QUESTION 5 [10 Marks]

a. Operating systems have evolved through a number of distinct phases or generations which corresponds roughly to the decades. In third generation of operating systems, the operating system designers developed a multiprogramming concept. Briefly describe what multiprogramming is.

(2 marks)

b. Explain the following terms and their working with the diagram.
   i. Spooling
   ii. Time-sharing operating system

(4 marks)

c. Describe the function of task manager tool in Windows 10 operating system.

(2 marks)

d. How do the operating system differentiate or recognize the different type of each file stored in a disk and give some examples to support your answers?

(2 marks)

End of Paper